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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*).
2. Texts in the figures are not translated and shown as it is.

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Dictionary: Last updated 11/18/2008 / Priority: 1. Information communication technology (ICT) / 2. Electronic engineering / 3. Technical term

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## FULL CONTENTS

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### [Claim(s)]

[Claim 1] It is the method of adjusting the gain of the transmission amplifier with which these pieces of equipment was equipped to Ross of the cable which connects a pair of equipment. If an adjust signal is transmitted to the equipment of another side through a cable and the equipment of another side receives the adjust signal concerned correctly, while one equipment raises the gain of self transmission amplifier. If the received adjust signal concerned is turned up, it transmits to one equipment through a cable and one equipment receives the turned-up adjust signal concerned correctly, raising the gain of self transmission amplifier. Make into the minimum value gain of said transmission amplifier of the self which it is continuing raising, and [ with this ] [ make gain of self transmission amplifier when it becomes impossible for the equipment of another side to receive an adjust signal correctly from one equipment into the set point, and / the state where the gain of the transmission amplifier of the equipment of another side is the set point ] further. While one equipment raises the gain of self transmission amplifier, an adjust signal is transmitted to the equipment of another side through a cable. The amplifier gain adjustment method for the cable loss which makes the set point gain of the self transmission amplifier when receiving correctly the adjust signal returned through a cable from the equipment of another side, and is characterized by adjusting the gain of the transmission amplifier of these pieces of equipment to each set point.

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### [Detailed Description of the Invention]

[0001] [ this invention ] like the office equipment used for a subscriber wireless local loop, for example. It is applied to the equipment which divided the composition of equipment and connected these device units of each other through the cable, and is related with the method of carrying out an adjustment setup of the gain of the transmission amplifier formed in each device unit at a proper value to Ross produced by the cable transmission concerned.

### [0002]

[Description of the Prior Art] The subscriber wireless local loop by which the slave-station equipment by which fixed installation was carried out as well as the master-station equipment by which fixed installation was carried out is called FWA etc. as a system which performs wireless communications is

known. A subscriber wireless local loop installs the subscriber station equipment which is a slave station in member's house. It is the system which carries out wireless communications to the base station equipment as a master station which connected to the subscriber station equipment concerned LAN which accommodated terminal units and two or more terminal units, such as a personal computer, and was connected to backbone communication networks, such as subscriber station equipment, a broader-based line network (WAN), etc. concerned.

[0003] [ in such a radio communications system, in order to avoid an obstacle etc. and to perform good wireless communications, install subscriber station equipment and base station equipment in the heights the roof of a building thing, on a column, etc., but ] The small weight saving of the composition of these office equipment is divided and carried out, and installing only the device unit equipped with an antenna and its circumference circuit apparatus in an outdoor height is performed. For example, as shown in drawing 1 , [ subscriber station equipment ] An interface, its circumference circuit apparatus, etc. with a wire circuit, such as subscriber terminal equipment LAN, to have had The indoor arrangement unit 100 (only henceforth an indoor arrangement), While it is divided into the outdoor arrangement unit 200 (only henceforth an indoor arrangement) equipped with an antenna, its circumference circuit apparatus, etc. and the indoor arrangement 100 is installed in indoor [ of a subscription company residence ], the outdoor arrangement 200 is installed on an outdoor steel tower. It has the composition of having connected these indoor arrangements 100 and the outdoor arrangement 200 with the cable 300.

[0004] In addition, especially [ a subscriber wireless local loop ] In order to install the antenna of subscriber station equipment or base station equipment in a height in order to perform communication in a certain limited high-frequency-radio-communications band and to avoid an electromagnetic interference, and to accommodate many pieces of subscriber station equipment in one piece of base station equipment further, Since subscriber station equipment uses the directive high antenna of a parabolic antenna etc. in order to avoid interference, it is necessary to install the antenna of subscriber station equipment in a height, and it needs to carry out division composition of the office equipment in this way at an indoor arrangement and an outdoor arrangement.

[0005] [Problem to be solved by the invention] Here, when it divides into an indoor arrangement and an outdoor arrangement as mentioned above and connects by a cable, the length of a cable serves as several meters - 100m of numbers by an installation, and loss of the signal which transmits a cable cannot be disregarded. For this reason, a signal is amplified with the transmission amplifier formed in the indoor arrangement and the outdoor arrangement, respectively, and even if there is cable loss, it is necessary to enable it to transmit exact data in the signal transmission through the cable between an indoor arrangement and an outdoor arrangement. However, to cable loss, it is work very complicated [ adjusting the transmission amplifier of each equipment to suitable gain ], and difficult, and there was a request which enables it to adjust such amplifier gain appropriately easily.

[0006] This invention was made in view of the above-mentioned conventional situation, and when transmitting the signal amplified with transmission amplifier through a cable like an above-mentioned indoor arrangement and an above-mentioned outdoor arrangement among a pair of equipment, it aims at offering the method that the gain of these transmission amplifier can be adjusted easily and appropriately. In addition, the further purpose of this invention is a clear place in the following explanation.

[0007]

[Means for solving problem] This invention is the method of adjusting the gain of the transmission amplifier with which these pieces of equipment was equipped to Ross of the cable which connects a pair of equipment. If an adjust signal is transmitted to the equipment of another side through a cable and the equipment of another side receives the adjust signal concerned correctly, while one equipment raises the gain of self transmission amplifier If the received adjust signal concerned is turned up, it transmits to one equipment through a cable and one equipment receives the turned-up adjust signal concerned correctly, raising the gain of self transmission amplifier Make into the minimum value gain of said transmission amplifier of the self which it is continuing raising, and [ with this ] [ make gain of self transmission amplifier when it becomes impossible for the equipment of another side to receive an adjust signal correctly from one equipment into the set point, and / the state where the gain of the transmission amplifier of the equipment of another side is the set point ] further While one equipment raises the gain of self transmission amplifier, an adjust signal is transmitted to the equipment of another side through a cable. Gain of the self transmission amplifier when receiving correctly the adjust signal returned through a cable from the equipment of another side is made into the set point, and the gain of the transmission amplifier of these pieces of equipment is adjusted to each set point.

[0008] In addition, this invention sets the control program which collaborates and performs the above-mentioned sequence as the control section of each equipment. It may be made to adjust the gain of each transmission amplifier automatically, and a worker operates each equipment by the above-mentioned sequence, and may be made to adjust the gain of each transmission amplifier. Moreover, of course, this invention can apply the signal amplified with transmission amplifier among a pair of equipment besides the transmission amplifier gain adjustment of the indoor arrangement of a subscriber wireless local loop, and an outdoor arrangement also to a system with various composition of carrying out cable transmission.

[0009]

[Mode for carrying out the invention] This invention is concretely explained based on the work example applied to the subscriber station equipment of the subscriber wireless local loop as shown in drawing 1 . The main composition concerning this invention of the indoor arrangement 100 and the outdoor arrangement 200 is shown in drawing 2 .

[0010] The control section 101 by which the indoor arrangement 100 controls processing that the indoor arrangements concerned including communication with subscriber terminal equipment are various, The transmission amplifier 102 which amplifies the signal (uphill signal) transmitted to the outdoor arrangement 200 through a cable 300, It has the receive section 103 which receives the signal (getting down signal) from the outdoor arrangement 200 through a cable 300, and the regulating terminal which can adjust gain by a control section 101 is prepared in the transmission amplifier 102.

[0011] The control section 201 which controls processing that the outdoor arrangements concerned including wireless communications according [ the outdoor arrangement 200 ] to an antenna are various, With the receive section 202 which receives the signal (uphill signal) from the indoor arrangement 100 through a cable 300 The transmission amplifier 203 which amplifies the signal (getting down signal) transmitted to the indoor arrangement 100 through a cable 300, It has the selector 204 which changes a path for the signal received in the receive section 202 to transmission from the transmission amplifier 203 by control by a control section 201, and the regulating terminal which can adjust gain by a control section 201 is prepared in the transmission amplifier 203.

[0012] In such an equipment configuration, the adjustment method of this invention is enforced as

follows. The sequence of regulated treatment is shown in drawing 3, the procedure by the indoor arrangement 100 is shown in drawing 4, and the procedure by the outdoor arrangement 200 is shown in drawing 5. [ with first, the indicating input in the spot according to a certain \*\*\*\*\* by the indication signal from a remote place ] A selector 204 is controlled and a signal path is changed, and it had been received by the control section 201 through the cable 300 in the receive section 202, it gets down from the transmission amplifier 203 from signal data, lets a cable 300 pass as a signal, and it is made to transmit to the indoor arrangement 100 by return as preparation of operation of the adjustment method. In addition, a control section 201 may be made to perform the change of this signal path ignited by the outdoor arrangement 200 having received the following adjust signal automatically.

[0013] Thus, where a signal path is changed to adjustment, the control section 101 of the indoor arrangement 100 generates a known data signal (this example signal of "1") as an adjust signal, and inputs into the transmission amplifier 102 ((1) of Step S1 and drawing 3). The gain of the transmission amplifier 102 is raised gradually ((2) of Step S2 and drawing 3). The going-up adjust signal outputted from this transmission amplifier 102 is received through a cable 300 in the receive section 202 of the outdoor arrangement 200. When this received adjust signal can carry out reception detection of the control section 201 correctly (namely, "1"), the (step S11, (3)) of drawing 3, and the gain of the transmission amplifier 203 are raised gradually ((4) of Step S12 and drawing 3). That is, the gain control signal of the transmission amplifier 203 is giving the property which raises the gain of the transmission amplifier 203 in proportion to the time which detected the known signal, and has changed into the gain of amplifier the time which detected the known signal.

[0014] The adjust signal which is turned up and transmitted through a cable 300 from the outdoor arrangement 200 in the indoor arrangement 100 and from which it gets down is received in a receive section 103. When this received adjust signal can carry out reception detection of the control section 101 correctly (namely, "1"), the (step S3, (5)) of drawing 3, and the gain of the transmission amplifier 102 which was being increased are reduced to the minimum value "zero" ((6) of Step S4 and drawing 3). When it becomes impossible for the going-up adjust signal which the control section 201 of the outdoor arrangement 200 has received to receive correctly due to this gain fall (namely, "0"), and the (step S13), The gain at the time of the transmission amplifier 203 is held, and let this be the set point ((7) of Step S14 and drawing 3).

[0015] That is, the gain value of the transmission amplifier 203 is set up so that the reception detection of the adjust signal which the indoor arrangement 100 transmitted through the cable 300, and was turned up through the cable 300 by the outdoor arrangement 200 can be carried out correctly.

[0016] On the other hand in connection with this, the control section 101 of the indoor arrangement 100 checks the time (namely, "0") of it becoming impossible for the adjust signal from which it gets down to receive correctly ((8) of Step S5 and drawing 3). Thus, if it checks that the adjust signal from which it gets down has been set to "0", the control section 101 of the indoor arrangement 100 raises the gain of the transmission amplifier 102 in the state where it has been continued by the known data signal "1" and it is transmitted, gradually again ((9) of Step S6 and drawing 3). When the adjust signal with which the transmission amplifier 203 is turned up as mentioned above via the outdoor arrangement 200 by which gain setting was carried out can receive correctly (namely, "1") in a receive section 103, and the (step S7, (10)) of drawing 3, A control section 101 holds the gain at the time of the transmission amplifier

102, and makes this the set point ((11) of Step S8 and drawing 3 ).

[0017] That is, the gain value of the transmission amplifier 102 is set up so that the reception detection of the adjust signal which the indoor arrangement 100 transmitted through the cable 300, and was turned up through the cable 300 by the outdoor arrangement 200 can be carried out correctly.

[0018] It is not concerned with the length of a cable but the gain of the transmission amplifier 102 and 203 of both equipment is appropriately adjusted because control sections 101 and 201 perform the above sequence control. Here, in spite of having raised the gain of the transmission amplifier 103 concerned to the upper limit when setting the upper limit threshold as the amount of gain adjustments of the transmission amplifier 103 as shown in drawing 3 , if an adjust signal is correctly unreceivable, it is detectable as it being unusual that the cable 300 is disconnected etc.

[0019] Moreover, contrary to the above-mentioned example, the selector which changes the signal path at the time of adjustment to the indoor arrangement 100 is prepared, and as the outdoor arrangement side generates the signal for adjustment, you may make it adjust each transmission amplifier gain by technique contrary to the above-mentioned example.

[0020]

[Effect of the Invention] As explained above, according to this invention, like the indoor arrangement and outdoor arrangement of a subscriber wireless local loop When transmitting the signal amplified with transmission amplifier through a cable among a pair of equipment, it cannot be concerned with loss of a cable, but the gain of these transmission amplifier can be adjusted easily and appropriately, and office equipment can be installed easily and appropriately in various installation conditions.

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the subscriber station equipment of the subscriber wireless local loop which applied this invention.

[Drawing 2] It is the block diagram of the subscriber station equipment which applied this invention.

[Drawing 3] It is the sequence diagram showing an example of the adjustment method concerning this invention.

[Drawing 4] It is the flow chart which shows an example of processing with the indoor arrangement which applied this invention.

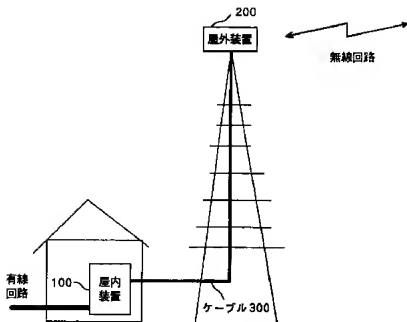
[Drawing 5] It is the flow chart which shows an example of processing with the outdoor arrangement which applied this invention.

[Explanations of letters or numerals]

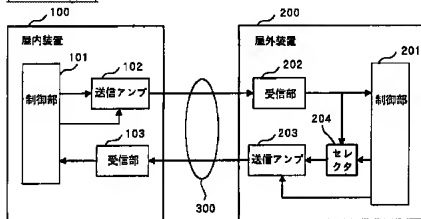
100: Indoor arrangement 101: A control section, 102:transmission amplifier 103: A receive section, 200: outdoor arrangement 201: A control section, 202:receive section 203: Transmission amplifier, 204: selector 300: Cable,

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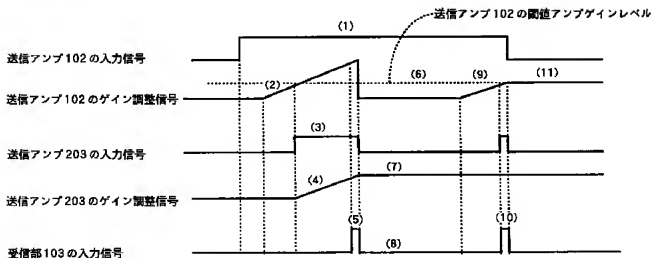
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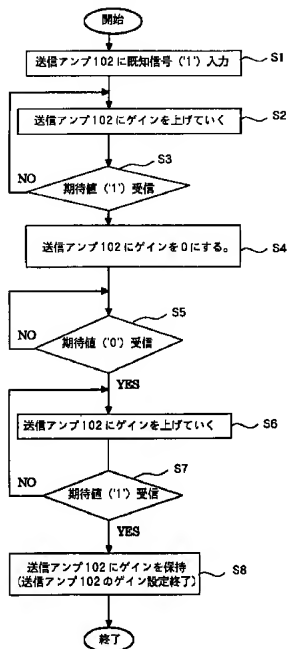
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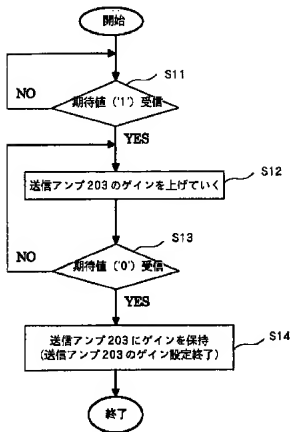
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]